

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

IN THE CLAIMS:

1. (Currently Amended) Lifting mechanism (100) with a hydraulic control and adjustment system and a working tool (6) in a mobile machine with at least a first and second lifting cylinder (61, 62), in which cylinder pistons (63, 65) are displaceable, the position or direction of movement of which in the lifting cylinders (61, 62) fix the lifting height or the vertical direction of movement of the working tool (6) relative to a vehicle body (4) of the mobile machine, wherein each of the cylinder pistons (63, 65) divides the associated lifting cylinder (61, 62) into two adjusting pressure chambers (67 and 68, 69 and 70) in each case and with a first hydraulic pump (75), adjustable in respect of the discharge volume, the first connection (74) of which is connected depending on the vertical direction of movement of the working tool (6) to one of the adjusting pressure chambers (67) of the first lifting cylinder (61) and one of the adjusting pressure chambers (69) of the second lifting cylinder (62) and the second connection (77) of which is connected in a closed circuit to the other adjusting pressure chamber (68) of the first lifting cylinder (61) and the other adjusting pressure chamber (70) of the second lifting cylinder (62),

characterized in that

wherein a piston side adjusting pressure chamber (67) of the first lifting cylinder (61) is connected to a piston rod side adjusting pressure chamber (69) of the second lifting cylinder (62) via a first hydraulic line (71) and a piston rod side adjusting pressure chamber (68) of the first lifting cylinder (61) is connected to a piston side adjusting pressure chamber (70) of the

second lifting cylinder (62) via a second hydraulic line (72) and the first lifting cylinder (61) and the adjusting piston (65, 143) of the second lifting cylinder (62) are connected to a boom (64) connecting the working tool (6) to the vehicle body (4) of the mobile machine and the second lifting cylinder (62) and the adjusting piston (63, 142) of the first lifting cylinder (61) are connected to the body (4) of the mobile machine.

2. (Currently Amended) Lifting mechanism according to claim 1,

characterized in that

wherein in each case a first adjusting pressure chamber (68; 69) borders on the associated cylinder piston (63; 65) with a pressurisation face (A1) which is smaller than the pressurisation face (A2) with which the other second adjusting pressure chamber (67; 70) in each case borders on the corresponding cylinder piston (63; 65) and in that each connection (74; 77) of the hydraulic pump (75) is connected to a first adjusting pressure chamber (68; 69) with a smaller pressurisation face (A1) and a second adjusting pressure chamber (70; 67) with a larger pressurisation face (A2).

3. (Currently Amended) Lifting mechanism according to claim 1 or 2,

characterized in that

wherein the two boom side adjusting pressure chambers (144, 146) of the first and second lifting cylinders (61, 62) are connected via a first hydraulic line (151) and the two vehicle body side adjusting pressure chambers (145, 147) of the first and second lifting cylinders (61, 62) via a second hydraulic line (152).

4. (Currently Amended) Tilting mechanism (200) with a hydraulic control and adjustment system and with a loading shovel (6) serving as a working tool (6) in a mobile machine with at least a first and second shovelling cylinder (1, 2), in which cylinder pistons (3, 5) are displaceable, the position or direction of movement of which in the shovelling cylinders (1, 2) fix the tilting angle or the tilting direction of the loading shovel (6) relative to a vehicle body (4), wherein each of the cylinder pistons (3, 5) divides the associated shovelling cylinder (1, 2) into two adjusting pressure chambers (7 and 8, 9 and 10) in each case, and with a second hydraulic pump (15), adjustable in respect of the discharge volume, the first connection (14) of which is connected depending on the tilting direction of the loading shovel (6) to one of the adjusting pressure chambers (7) of the first shovelling cylinder (1) and one of the adjusting pressure chambers (10) of the second shovelling cylinder (2) and the second connection (17) of which is connected in a closed circuit to the other adjusting pressure chamber (8) of the first shovelling cylinder (1) and the other adjusting pressure chamber (9) of the second shovelling cylinder (2),

characterized in that

wherein the piston side adjusting pressure chamber (7) of the first shovelling cylinder (1) is connected to the piston rod side adjusting pressure chamber (10) of the second shovelling cylinder (2) via a first hydraulic line (11) and the piston rod side adjusting pressure chamber (8) of the first shovelling cylinder (1) is connected to the piston side adjusting pressure chamber (9) of the second shovelling cylinder (2) via a second hydraulic line (12) and the first shovelling cylinder (1) and the adjusting piston (5, 131) of the second shovelling cylinder (2) are connected to the loading shovel (6) and the second shovelling cylinder (2) and the

adjusting piston (~~3, 130~~) of the first shovelling cylinder (~~1~~) are connected to the body (~~4~~) of the mobile machine.

5. (Currently Amended) Tilting mechanism according to claim 4,

characterized in that

wherein in each case a first adjusting pressure chamber (~~8, 10~~) borders on the associated cylinder piston (~~3, 5~~) with a pressurisation face (A1) which is smaller than the pressurisation face (A2) with which the other second adjusting pressure chamber (~~7, 9~~) in each case borders on the corresponding cylinder piston (~~3, 5~~) and in that each connection (~~14, 17~~) of the hydraulic pump (~~15~~) is connected to a first adjusting pressure chamber (~~10, 8~~) with a smaller pressurisation face (A1) and a second adjusting pressure chamber (~~9, 7~~) with a larger pressurisation face (A2).

6. (Currently Amended) Tilting mechanism according to claim 4 ~~or 5~~.

characterized in that

wherein the two loading shovel side adjusting pressure chambers (~~132, 134~~) of the first and second shovelling cylinders (~~1, 2~~) are connected via a first hydraulic line (~~136~~) and the two vehicle body side adjusting pressure chambers (~~133, 135~~) of the first and second shovelling cylinders (~~1, 2~~) via a second hydraulic line (~~137~~).

7. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 1 ~~and 4~~,

characterized in that

wherein the discharge direction of the first hydraulic pump (75) operating in two-quadrant operation fixes the vertical direction of movement of the working tool (6) or the discharge direction of the second hydraulic pump (15), likewise operating in two-quadrant operation, fixes the tilting direction of the loading shovel (6).

8. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 1 ~~and 4~~,

characterized in that

wherein the discharge volume discharged at the first and second connections (74, 77) of the first hydraulic pump (75) fixes the lifting height of the working tool (6) or the discharge volume discharged at the first and second connection (14, 17) of the second hydraulic pump (15) fixes the tilting angle of the loading shovel (6).

9. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 8,

characterized in that

wherein the adjustment of the discharging device of the second hydraulic pump (15) and the discharge volume discharged at the first and second connections (14, 17) of the second hydraulic pump (15) is done as a function of a deflection set on a steering instrument (52) constructed in the manner of a joystick in a first deflection dimension and the setting of the direction of rotation of the first hydraulic pump (75) and the adjusting pressure built up at the first and second connections (74, 77) of the first hydraulic pump (75) is done as a function of

a deflection set on the steering instrument (52) constructed in the manner of a joystick in a second deflection dimension.

10. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 9,

~~characterized in that~~

wherein a first adjusting valve (41) is actuated as a function of the deflection of the steering instrument (52) in the first deflection dimension and a second adjusting valve (402) is actuated as a function of the deflection of the steering instrument (52) in the second deflection dimension.

11. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 10,

~~characterized in that~~

wherein the deflection of the first adjusting valve (41) is done by electric adjusting magnets on control connections (49, ~~50~~) of the first adjusting valve (41), wherein one control connection (49) receives a first electric signal, corresponding to the deflection of the steering instrument (52) in the direction of the first deflection dimension, corresponding to the tilting inwards movement, and the other control connection (50) receives a second electric signal, corresponding to the deflection of the steering instrument (52) in the direction of the first deflection dimension, corresponding to the tilting outwards movement, from a transformer of the steering instrument (52) and in that the deflection of the second adjusting valve (402) is done by electric adjusting magnets at control connections (110, ~~111~~) of the second adjusting valve (402), wherein one control connection (110) receives a third electric signal, corresponding to the deflection of the steering instrument (52) in the direction of the second

deflection dimension, corresponding to the lifting movement, and the other control connection (111) receives a fourth electric signal, corresponding to the deflection of the steering instrument (52) in the direction of the second deflection dimension, corresponding to the lowering movement, from a transformer of the steering instrument (52).

12. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 10,

~~characterized in that~~

wherein the deflection of the first adjusting valve (41) is done by adjusting pressures generated by a pilot control device (130) from the deflection of the steering instrument (52) in the first deflection dimension and supplied to control chambers located at the two control connections (49, 50) of the first adjusting valve (42) and the deflection of the second adjusting valve (102) is done by adjusting pressures generated by the pilot control device (130) from the deflection of the steering instrument (52) in the second deflection dimension and supplied to control chambers located at the two control connections (110, 111) of the second adjusting valve (102).

13. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 12,

~~characterized in that~~

wherein via a first pair of pressure reducing valves (143) consisting of two pressure reducing valves (139, 140), the inputs of which are connected in each case to a high pressure side connection (24) of a first feed pump (19), and a hydraulic tank (138) which generates adjusting pressures corresponding to the deflection of the steering instrument (52) in the two directions of the first deflection dimension, the pilot control device (130) generates

corresponding adjusting pressures for actuating the first adjusting valve (42) and via a second pair of pressure reducing valves (144), consisting of two pressure reducing valves (141, 142), the inputs of which are connected in each case to a high pressure side connection (24) of a first feed pump (19) and a first hydraulic tank (138) which generates adjusting pressures corresponding to the deflection of the steering instrument (52) in the two directions of the second deflection dimension for the second adjusting valve (102).

14. (Currently Amended) Lifting ~~and tilting~~ mechanism according to ~~one of claims 10 to 13, claim 10,~~

characterized in that

wherein the first and second adjusting valve (41, 102) is in each case a 4/3 port directional control valve, wherein the first input connection (44, 105) of the first adjusting valve (41) is connected to the high pressure side connection (24) of the first feed pump (19), the first input connection (105) of the second adjusting valve (102) is connected to a high pressure side connection (84) of a second feed pump (79), the second input connection (46, 107) of the first and second adjusting valves (41, 102) is connected in each case to a hydraulic tank (48, 109), the first output connection (40) of the first adjusting valve (41) is connected to a first adjusting pressure chamber (37) of a first adjusting device (35), the first output connection (101) of the second adjusting valve (102) is connected to a first adjusting pressure chamber (97) of a second adjusting device (95), the second output connection (43) of the first adjusting valve (41) is connected to a second adjusting pressure chamber (38) of a first adjusting device (35) and the second out put connection (104) of the second adjusting valve (102) is connected to a second adjusting pressure chamber (98) of a second adjusting device (95).

15. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 14,

characterized in that

wherein adjustment of the second hydraulic pump (15) in respect of the discharge direction and the discharge volume discharged at the first and second connection (14, 17) is done by the first adjusting device (35) and adjustment of the first hydraulic pump (75) in respect of the discharge direction and the discharge volume discharged at the first and second connections (74, 77) by the second adjusting device (95).

16. (Currently Amended) Lifting ~~and tilting~~ mechanism according to ~~one of claims 13 to 15~~ claim 13,

characterized in that

wherein the second hydraulic pump (15) and the first feed pump (19) or the first hydraulic pump (75) and the second feed pump (79) are driven by a common shaft (18, 78) in each case of a common or in each case separate machine, in particular by a diesel aggregate.

17. (Currently Amended) Lifting ~~and tilting~~ mechanism according to ~~one of claims 13 to 16~~ claim 13,

characterized in that

wherein a low pressure side connection (20) of the first feed pump (19) is connected via a filter (22) to a hydraulic tank (23), a low pressure side connection (80) of the second feed pump (79) via a filter (82) to a hydraulic tank (83), the high pressure side connection (24) of the first feed pump (19) via a check valve (29, 30) in each case to a first hydraulic load line (13) attached to a first connection (14) of the second hydraulic pump (15) and to a second

hydraulic load line (16) attached to a second connection (17) of the second hydraulic pump (15) and the high pressure side connection (84) of the second feed pump (79) via a check valve (89, 90) in each case to a third hydraulic load line (73) attached to a first connection (74) of the first hydraulic pump (75) and to a fourth hydraulic load line (76) attached to a second connection (77) of the first hydraulic pump (75).

18. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 17,

characterized in that

wherein a check valve (55, 116) with an opener (58, 129) is provided in the first and third hydraulic load lines (13, 73) in each case.

19. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 18,

characterized in that

wherein after transformation into a corresponding pressure, the second electric adjusting signal actuates an opener (58) of the check valve (55) integrated in the first hydraulic load line (13) and, after transformation into a corresponding pressure, the fourth electric adjusting signal actuates an opener (129) of the check valve (116) integrated in the third hydraulic load line (73).

20. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 17,

characterized in that

wherein the second adjusting pressure generated by the pilot control device (130) actuates an opener (58) of the check valve (55) integrated in the first hydraulic load line (13) and the

fourth adjusting pressure generated by the pilot control device (130) actuates an opener (129) of the check valve (116) integrated in the third hydraulic load line (73).

21. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 17,

characterized in that

wherein located between the third and fourth hydraulic load lines (73, 76) is a 2/2 port directional control valve (119) which opens in the operating state “floating position” of the boom (64) by applying an electric signal to an electric adjusting magnet located at the control input (121) of the 2/2 port directional control valve (119) or alternately by applying an adjusting pressure in a control chamber located at the control input (121) of the 2/2 port directional control valve (119).

22. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 17,

characterized in that

wherein the third hydraulic load line (73) is connected via a hydraulic line (128) to a hydraulic control arrangement (125) to damp pitching oscillations of the working tool (6) while the mobile machine is travelling.

23. (Currently Amended) Lifting ~~and tilting~~ mechanism according to claim 22,

characterized in that

wherein an electric signal corresponding to the speed of the mobile machine is conducted from a tachogenerator (126) of the mobile machine to the input (127) of the hydraulic control

arrangement (125) to damp pitching oscillations of the working tool (6) while the mobile machine is travelling.

24. (New) Tilting mechanism according to claim 4, wherein the discharge direction of the first hydraulic pump operating in two-quadrant operation fixes the vertical direction of movement of the working tool or the discharge direction of the second hydraulic pump, likewise operating in two-quadrant operation, fixes the tilting direction of the loading shovel.

25. (New) Tilting mechanism according to claim 4, wherein the discharge volume discharged at the first and second connections of the first hydraulic pump fixes the lifting height of the working tool or the discharge volume discharged at the first and second connection of the second hydraulic pump fixes the tilting angle of the loading shovel.

26. (New) Tilting mechanism according to claim 25, wherein the adjustment of the discharging device of the second hydraulic pump and the discharge volume discharged at the first and second connections of the second hydraulic pump is done as a function of a deflection set on a steering instrument constructed in the manner of a joystick in a first deflection dimension and the setting of the direction of rotation of the first hydraulic pump and the adjusting pressure built up at the first and second connections of the first hydraulic pump is done as a function of a deflection set on the steering instrument constructed in the manner of a joystick in a second deflection dimension.

27. (New) Tilting mechanism according to claim 26, wherein a first adjusting valve is actuated as a function of the deflection of the steering instrument in the first deflection dimension and a second adjusting valve is actuated as a function of the deflection of the steering instrument in the second deflection dimension.

28. (New) Tilting mechanism according to claim 27, wherein the deflection of the first adjusting valve is done by electric adjusting magnets on control connections of the first adjusting valve, wherein one control connection receives a first electric signal, corresponding to the deflection of the steering instrument in the direction of the first deflection dimension, corresponding to the tilting inwards movement, and the other control connection receives a second electric signal, corresponding to the deflection of the steering instrument in the direction of the first deflection dimension, corresponding to the tilting outwards movement, from a transformer of the steering instrument and in that the deflection of the second adjusting valve is done by electric adjusting magnets at control connections of the second adjusting valve, wherein one control connection receives a third electric signal, corresponding to the deflection of the steering instrument in the direction of the second deflection dimension, corresponding to the lifting movement, and the other control connection receives a fourth electric signal, corresponding to the deflection of the steering instrument in the direction of the second deflection dimension, corresponding to the lowering movement, from a transformer of the steering instrument.

29. (New) Tilting mechanism according to claim 27, wherein the deflection of the first adjusting valve is done by adjusting pressures generated by a pilot control device from the deflection of the steering instrument in the first deflection dimension and supplied to control chambers located at the two control connections of the first adjusting valve and the deflection of the second adjusting valve is done by adjusting pressures generated by the pilot control device from the deflection of the steering instrument in the second deflection dimension and supplied to control chambers located at the two control connections of the second adjusting valve.

30. (New) Tilting mechanism according to claim 29, wherein via a first pair of pressure reducing valves consisting of two pressure reducing valves, the inputs of which are connected in each case to a high pressure side connection of a first feed pump, and a hydraulic tank which generates adjusting pressures corresponding to the deflection of the steering instrument in the two directions of the first deflection dimension, the pilot control device generates corresponding adjusting pressures for actuating the first adjusting valve and via a second pair of pressure reducing valves, consisting of two pressure reducing valves, the inputs of which are connected in each case to a high pressure side connection of a first feed pump and a first hydraulic tank which generates adjusting pressures corresponding to the deflection of the steering instrument in the two directions of the second deflection dimension for the second adjusting valve.

31. (New) Tilting mechanism according to claim 27, wherein the first and second adjusting valve is in each case a 4/3 port direction control valve, wherein the first input connection of the first adjusting valve is connected to the high pressure side connection of the first feed pump, the first input connection of the second adjusting valve is connected to a high pressure side connection of a second feed pump, the second input connection of the first and second adjusting valves is connected in each case to a hydraulic tank, the first output connection of the first adjusting valve is connected to a first adjusting pressure chamber of a first adjusting device, the first output connection of the second adjusting valve is connected to a first adjusting pressure chamber of a second adjusting device, the second output connection of the first adjusting valve is connected to a second adjusting pressure chamber of a first adjusting device and the second output connection of the second adjusting valve is connected to a second adjusting pressure chamber of a second adjusting device.

32. (New) Tilting mechanism according to claim 28, wherein adjustment of the second hydraulic pump in respect of the discharge direction and the discharge volume discharged at the first and second connection is done by the first adjusting device and adjustment of the first hydraulic pump in respect of the discharge direction and the discharge volume discharged at the first and second connections by the second adjusting device.

33. (New) Tilting mechanism according to claim 30, wherein the second hydraulic pump and the first feed pump or the first hydraulic pump and the second feed pump are driven by a common shaft in each case of a common or in each case separate machine, in particular by a diesel aggregate.

34. (New) Tilting mechanism according to claim 30, wherein a low pressure side connection of the first feed pump is connected via a filter to a hydraulic tank, a low pressure side connection of the second feed pump via a filter to a hydraulic tank, the high pressure side connection of the first feed pump via a check valve in each case to a first hydraulic load line attached to a first connection of the second hydraulic pump and to a second hydraulic load line attached to a second connection of the second hydraulic pump and the high pressure side connection of the second feed pump via a check valve in each case to a third hydraulic load line attached to a first connection of the first hydraulic pump and to a fourth hydraulic load line attached to a second connection of the first hydraulic pump.

35. (New) Tilting mechanism according to claim 34, wherein a check valve with an opener is provided in the first and third hydraulic load lines in each case.

36. (New) Tilting mechanism according to claim 35, wherein after transformation into a corresponding pressure, the second electric adjusting signal actuates an opener of the check valve integrated in the first hydraulic load line and, after transformation into a corresponding pressure, the fourth electric adjusting signal actuates an opener of the check valve integrated in the third hydraulic load line.

37. (New) Tilting mechanism according to claim 34, wherein the second adjusting pressure generated by the pilot control device actuates an opener of the check valve integrated in the first hydraulic load line and the fourth adjusting pressure generated by the pilot control device actuates an opener of the check valve integrated in the third hydraulic load line.

38. (New) Tilting mechanism according to claim 34, wherein located between the third and fourth hydraulic load lines is a 2/2 port directional control valve which opens in the operating state "floating position" of the boom by applying an electric signal to an electric adjusting magnet located at the control input of the 2/2 port directional control valve or alternately by applying an adjusting pressure in a control chamber located at the control input of the 2/2 port directional control valve.

39. (New) Tilting mechanism according to claim 34, wherein the third hydraulic load line is connected via a hydraulic line to a hydraulic control arrangement to damp pitching oscillations of the working tool while the mobile machine is travelling.

40. (New) Tilting mechanism according to claim 39, wherein an electric signal corresponding to the speed of the mobile machine is conducted from a tachogenerator of the mobile machine to the input of the hydraulic control arrangement to damp pitching oscillations of the working tool while the mobile machine is travelling.